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ABSTRACT

"Newsday" has developed a "Science Education Series Program" to help teachers use the newspaper effectively and with a minimum of preparation time to move content limits from the textbook to the current frontiers of research. The program consists of worksheets that advance content goals and other worksheets that advance reasoning skills and an understanding of scientific methods. This study determined how the use of this program's activities affected selected ninth-grade students' (N=136) comprehension of science reading material. Results showed no difference between students (with standardized reading and mathematics scores at least 2 years above grade level) when taught using the "Newsday" program or when taught newspaper science articles' content without the articles. However, students with standardized scores on grade level, using "Newsday's" format, scored better than students taught using other formats. This suggests that the Science Education Series program may improve students' comprehension of science reading material when students have "average" reading ability. Several questions for further research are posed based on these findings. (JN)

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"How Does the Use of Newsday's Science Education Series Program Affect Selected Ninth Grade Students' Comprehension of Science Reading Material?"

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"How Does the Use of Newsday's Science Education Series Program Affect Selected Ninth Grade Students' Comprehension of Science Reading Material?"

Reading is a communication process that is crucial to students in all learning areas, but especially in science (Rowe, 1973). Printed text materials are the most widely used teacher aids in the science classroom. Whether working individually or in groups, students are constantly referring to textbooks, articles, handouts, and laboratory manuals. If used properly, such material can facilitate student achievement (Collette and Chiappa, 1984). It is imperative that students comprehend science reading material.

The purpose of the present study was to determine how the use of Newsday's Science Education Series Program affected selected ninth grade students' comprehension of science reading material.

SAMPLE AND METHODOLOGY

The students involved in the study were 136 New York City ninth graders, divided into six classes. Three classes consisted of students with standardized reading and mathematics scores at least 2 years above grade level, while three classes consisted of students with standardized reading and mathematics scores on grade level. All students came from Queens, New York. Some walked to school while others used public transportation. They were of a middle socio-economic background. The sample was about one-half male and one-half female.

The Degrees of Reading Power test was administered to the sample in March, 1984. The instrument assesses a student's ability to comprehend prose material written at various levels of difficulty, has a psycholinguistic orientation, and resembles a modified Cloze format. There are several 325-word passages in which seven words are deleted. Students must choose the deleted word from five possible alternatives, using the surrounding text as a guide. Each blank has only one correct response. Students must read and comprehend the passages in order to respond correctly. The passages are arranged according to difficulty to ascertain the student's highest comprehension level. A majority of passages contain science subject matter. The Degrees of Reading Power test does not measure isolated skills, such as vocabulary, comprehension, and reading rate. It uses an integrated approach that measures reading comprehension holistically (Rosecrans and Baker-Taylor, 1983).

Newsday has developed a Science Education Series Program to help science teachers use the newspaper effectively and with a minimum of preparation time in order to move content limits from the textbook to the current frontiers of research. Through the use of general activity worksheets, newspaper articles become resources that help develop students' scientific processes skills, awareness of current science problems, and ability to comprehend written science material.

The Science Education Series Program consists of one set of general activity worksheets that advance content goals, and one set of general activity worksheets that advance reasoning skills and an understanding of scientific methods. On April 4, 1984, an article titled "Diet, Bacteria, May be Factors in Colon Cancer" appeared. The activities worksheet, "Report of Research Findings" was used with the article. Some questions the students had to answer after reading the article included:

1. To which area of science does the reported research apply?
2. Which laboratory, agency, individual, or researcher provided the data presented?
3. What findings or conclusions are described in the article?
4. Have these findings been corroborated by any other scientists? If so, describe the corroborating evidence.
5. Do you believe the reported findings are valid? Explain your answer.
6. Why do you think these findings are important to scientists?
7. Why do you think these findings are important to the average citizen?
8. When do think another article on this subject may appear?

Based upon the subject matter, newspaper science articles can be categorized in the Science Education Series Program. This will result in the teacher selecting a specific worksheet, involving the students in different, varied activities. The activities can be presented as a class assignment or individualized lessons. Activity time can vary, depending upon the nature of the exercise, the article's length, and the students' abilities. Worksheet questions can be deleted or expanded, depending upon teacher objectives, the science article's content, and the students' abilities. It is recommended that students be alerted for "follow-up" articles, editorials, or letters to the editor related to a science issue discussed in class.

One class (n=19) with students' standardized reading and mathematics scores at least 2 years above grade level, and one class (n=24) with students'

standardized reading and mathematics scores on grade level, followed the Newsday Science Education Series Program format. Once each week, for ten weeks, a newspaper science article was selected and categorized into an activity set:

TABLE I

A. Science Article Activities to Advance Content Goals.
   1. Report of Science-Related Problem of Local Concern.
   2. Report of Science-Related Problem of National Concern.
   3. Report of Research Findings.
   4. Report of Technological Advance.
   5. Report of Science Event.
   6. Report of Natural Phenomenon.
   7. Report of Controversy Within the Scientific Community.
   8. Presentation of a Theory of Cause and Effect.
   9. Presentation of a Science-Related Issue Resulting in an Ethical Dilemma.
   10. Editorial on a Science-Related Issue.

B. Science Article Activities to Advance Other Objectives.
   1. Interpretation of a Science-Related Editorial Cartoon.
   2. Reaction to an Interview.
   3. Construction of a Poster.
   4. Weather Page-Tide Tables.
   5. Weather Page-Facts.
   6. Identification of Solutes, Solvents, and Solutions.
   7. Interpretation of a Data Table.
   8. Interpretation of a Graph.
   9. Analysis of a Reported Experiment.
   10. Analysis of a Report of a Prediction.
   11. Experience in Analytical Reading.
   12. Experience in Questioning.

One class (n=29) with students' standardized reading and mathematics scores at least 2 years above grade level, and one class (n=21) with students' standardized reading and mathematics scores on grade level, read the same newspaper science articles as the first two classes cited, but the science teacher did not follow the Newsday Science Education Series Program format. The students read the science articles, discussed the content, and answered questions pertaining to the articles. The science teacher did not ever see the Newsday program. The science article's content was the only common factor between the classes that used the Newsday program and the one that did not.

Finally, one class (n=21) with students' standardized reading and mathematics scores at least 2 years above grade level, and one class (n=22) with students standardized reading and mathematics scores on grade level did not use

the Newsday Science Education Series Program format and did not read any newspaper science articles. The science teacher used the newspaper science article the other two groups (four classes) had read, but only to teach the article's content to the students. The science teacher for the group never saw the Newsday Science Education Series Program. The three science teachers involved in the study had similar professional backgrounds and experiences.

After ten weeks, the Degrees of Reading Power test was administered again. Correlated t-tests were used to evaluate the null hypothesis, "There is no change in selected ninth grade students' comprehension of science reading material, whether the students used the Newsday Science Education Series Program format, newspaper science articles alone, or were taught only content from specific newspaper science articles."

FINDINGS, ANALYSIS AND DISCUSSION

Analysis of variance results indicated that there was no statistically significant difference in the Degrees of Reading Power pre-test scores among the three classes composed of students with standardized reading and mathematics scores at least two years above grade level. The same was true for students with standardized reading and mathematics scores on grade level (See Table II).

TABLE II

Analysis of Variance for Degrees of Reading Power Pre-Test Scores

A. Students Above Grade Level:

	SS	d.f.	M.S.	F
Between	125.06	2	65.53	2.84+
Within	1475.58	67	22.02	
Totals	1600.64			

B. Students On Grade Level:

	SS	d.f.	M.S.	F
Between	222.23	2	111.12	0.97+
Within	4923.68	64	114.50	
Totals	5145.91			

+Not Significant.

Table III shows the results of the correlated t-tests, comparing the Degrees of Reading Power test scores before and after the study.

TABLE III

Degrees of Reading Power Pre-test and Post-test Scores: Correlated t-test

CLASS	FORMAT	PRE-TEST MEAN	POST-TEST MEAN	t
Above Grade Level (n=19)	Newsday Program	71.68	72.21	0.96+
Above Grade Level (n=29)	Newpaper Article	68.55	71.07	4.36**
Above Grade Level (n=21)	Content-No Article	70.71	71.43	1.91+
On Grade Level (n=24)	Newsday Program	63.58	66.83	2.27*
On Grade Level (n=21)	Newspaper Article	59.14	59.48	0.18+
On Grade Level (n=22)	Content-No Article	61.82	60.41	1.29+

**Significant at .01 level.

*Significant at .05 level.

+Not Significant.

Students with standardized reading and mathematics scores at least 2 years above grade level did not show a statistically significant difference between pre-test and post-test Degrees of Reading Power scores when taught using Newsday's Science Education Series Program, or when taught newspaper science articles' content without the articles. The null hypothesis must be accepted. But when taught using the newspaper science articles alone, there was a statistically significant increase in the Degrees of Reading Power scores at the .01 level. The null hypothesis must be rejected.

Students with standardized reading and mathematics scores on grade level who were taught using newspaper science articles alone, or who were taught newspaper articles' content alone did not show a statistically significant difference between pre-test and post-test Degrees of Reading Power scores. The null hypothesis must be accepted. But when taught using Newsday's Science Education Series Program, there was a statistically significant increase in the Degrees of Reading Power scores at the .05 level. The null hypothesis must be rejected.

Analysis of variance results indicated that there was no statistically significant difference in the Degrees of Reading Power post-test scores among the

three classes composed of students with standardized reading and mathematics scores at least 2 years above grade level, but analysis of variance results indicated that students with standardized scores on grade level and were taught using Newsday's Science Education Series Program scored significantly higher on Degrees of Reading Power post-test scores than students taught by either of the other two methods (See Table IV).

TABLE IV

Analysis of Variance for Degrees of Reading Power Post-test Scores

A. Students Above Grade Level:	SS	d.f.	M.S.	F
Between	15.07	2	7.54	0.30+
Within	1708.18	67	25.50	
Totals	1723.25			
B. Students On Grade Level:	**SS**	**d.f.**	**M.S.**	**F**
Between	738.40	2	369.20	6.47*
Within	3653.90	64	57.09	
Totals	4392.30			

+Not Significant

*Significant at .01 level.

Students with standardized scores on grade level, using Newsday's format, scored statistically significant gains from pre-test to post-test on the Degrees of Reading Power test. They scored significantly higher (.01 level) on the Degrees of Reading Power post-test than did similar students taught using either of the other two formats.

One implication is that Newsday's Science Education Series Program will improve students' comprehension of science reading material when students have "average" reading ability. One must note that students with standardized scores at least 2 years above grade level who were taught using Newsday's format had a Degrees of Reading Power pre-test mean of 71.68 (Table III), which is quite high, since the maximum score is 77.00. There was little room for improvement. Students taught using only newspaper science articles had a lower (68.55) pre-test mean. While no statistically significant results existed, more room for improvement did exist.

Further research is indicated. The study's duration must be increased. The number of science articles must be increased. How would students with standardized reading and mathematics scores below grade level fare? Will students' reading ability improve simply by reading?

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